

NON-PUBLIC?: N  
ACCESSION #: 8712230012  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Beaver Valley Power Station Unit 2 PAGE: 1 of 3

DOCKET NUMBER: 05000412

TITLE: Turbine Trip/Reactor Trip due to Thrust Bearing Trip caused by  
Personnel Error  
EVENT DATE: 11/17/87 LER #: 87-036-00 REPORT DATE: 12/17/87

OPERATING MODE: 1 POWER LEVEL: 098

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: William S. Lacey, Plant Manager TELEPHONE #: 412-643-1258

COMPONENT FAILURE DESCRIPTION:  
CAUSE: X SYSTEM: JE COMPONENT: XXXX MANUFACTURER: XXXX  
REPORTABLE TO NPRDS: N  
CAUSE: X SYSTEM: JJ COMPONENT: XXXX MANUFACTURER: XXXX  
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On 11/17/87 at 1406 hours, an I&C Technician working in the control room bumped and tripped the power supply switch to the Turbine Thrust Bearing Circuit supervisory Instrument. The resultant signal spike initiated a Thrust Bearing Failure signal which caused a Turbine Trip/Reactor Trip. The 4KV bus USST breakers tripped properly on a fast transfer and the SSST breakers closed properly, however, the USST breakers reclosed causing the tripped generator to be paralled with the system grid. The USST's were allowed to reclose due to a trip signal that does not seal in. Overcurrent on the "D" USST caused all four USSTs to retrip and lock open. While the system grid and generator were paralled, the (138KV) system supply breakers (OCB-94 & 85) to the "A,B,C & D" 4KV busses tripped open. This resulted in a total loss of AC power which placed the RCS in natural circulation. Both Emergency Diesel Generators started on an undervoltage signal and reenergized the "AE" and "DF" emergency busses. The (138KV) system supply breaker (OCB-85) reclosed restoring power to the "A & B" 4KV busses. The "A & B"

Reactor Coolant Pumps (RCP) were restarted. Following testing of the "B" System Station Service Transformer, the "C & D" 4KV busses were reenergized and the "C" RCP restarted. There were no safety implications resulting from this incident. On receipt of a bus undervoltage signal, the Emergency Diesel Generators successfully energized the emergency busses supplying power to class 1E loads. This event is analyzed in FSAR Section 15.2.6 (reactor trip from 100% power coincident with loss of offsite power).

(End of Abstract)

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On 11/17/87 at 1406 hours, an Instrument and Control Technician working in the control room bumped and tripped the power supply switch to the Turbine Thrust Bearing Circuit Supervisory Instrument. The resultant signal spike initiated a Thrust Bearing Failure signal which caused a Turbine Trip/Reactor trip. A fast bus transfer from the Unit Station Service Transformers (USST) to the System Station Service Transformers (SSST) was automatically initiated due to the immediate generator trip as a result of the Turbine Thrust Bearing Failure signal. After the transfer, the USST breakers immediately reclosed since the trip signal was not designed to seal-in. The generator was now connected to the system placing it in a motoring condition which caused the "2D" USST to develop an overcurrent condition and trip the USST 4KV supply breakers. At approximately the same time, the 138KV supply breaker to the "B" SSST (OCB-94) tripped (on overcurrent) causing a loss of offsite power to the "C", "D" and "DF" 4KV busses. The 138KV supply breaker to the "A" SSST (OCB-85) also cycled, causing a momentary loss of offsite power to the "A", "B" and "AE" 4KV busses. As a result of the undervoltage condition on each of the emergency busses ("AE" and "DF"), both emergency diesel generators started and energized the emergency busses. OCB-85 reclosed, restoring power to the "A" and "B" 4KV busses. At 1410 hours, RCP "A" was restarted and the plant stabilized in Mode 3. At 2152 hours, after testing the "B" SSST, OCB-94 was reclosed energizing the "C" and "D" 4KV busses.

This event was caused by several factors. The Thrust Bearing Failure trip relay did not seal in. The trip relays for the USST's 4KV breakers, the main transformer output and the exciter field breakers did not seal in. Also, a contact overlap in the closing coil circuit for the USST and SSST breakers allowed both set of breakers to close at the same time. The breaker trip relays would normally be held in by the source trip signal which

is normally sealed in. In this case, the source signal (Turbine Thrust Bearing Failure) by design does not seal in. Since the source signal did not seal in, the trip relays for the breakers did not seal in (they also, by design, have no seal-in). This removed the trip signal to the USST's allowing them to reclose.

To prevent a similar incident from occurring, several modifications have been made. The power supply switch to the Turbine Thrust Bearing Supervisory instrument has been disabled. A time-delay relay will be installed. This relay will disable the thrust bearing trip on a loss of power (to the instrument) and for a short time, delay when power is restored. The relays that trip the USST 4KV supply breakers, main transformer output breakers and exciter field breaker on a turbine thrust bearing trip are

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Westinghouse MG-6 self reset relays. To ensure a trip signal is maintained to the circuit after a trip signal has occurred, the self reset relays will be replaced with lockout type relays. To prevent the USST breakers from reclosing on a transfer from onsite to offsite power, a reclosure blocking scheme was added to the circuit. This was accomplished by adding knife switches in the closing circuit which are administratively controlled.

There were no safety implications due to this event as all ESF equipment functioned as per design as detailed above. This event was within the bounds of the Station's Safety Analysis (FSAR Section 15.2.6, Reactor Trip from 100% Power Coincident with Loss of Offsite Power).

A similar event involving a faulty fast bus transfer is recorded in LER 87-032-00.

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December 17, 1987  
ND3SPM:0120

Beaver Valley Power Station, Unit No. 2

Docket No. 50-412, License No. NPF-73  
LER 87-036-00

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Gentlemen:

In accordance with Appendix A, Beaver Valley Technical  
Specifications, the following Licensee Event Report is submitted:

LER 87-036-00, 10 CFR 50.73.a.2.iv, "Turbine Trip/Reactor  
Trip Due to Thrust Bearing Trip Caused by Personnel  
Error".

Very truly yours,

/s/ Wm. S. Lacey  
Wm. S. Lacey  
Plant Manager

tlu

Attachment

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ND3SPM:0120  
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